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TITLE: Onion topping machine - has rotating horizontal blade  
used while onions are advanced over grid by flaps

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Basic Abstract Text - ABTX (2):

Pref. the flails have reinforced rubber or elastomeric arms which just contact the grid when at their lowest point

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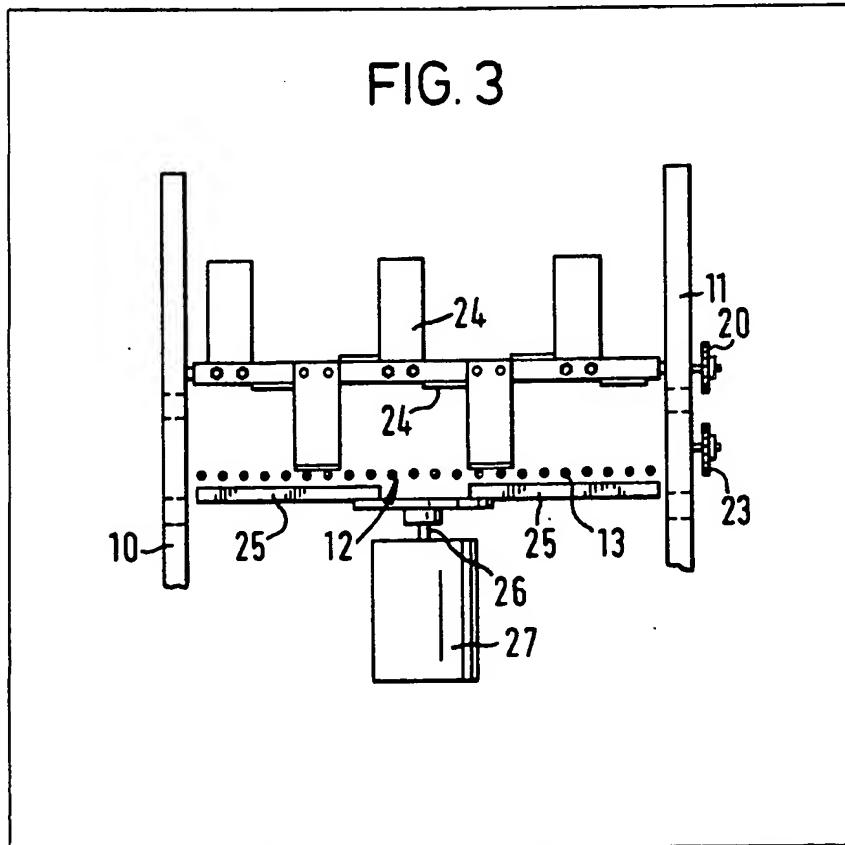
61/62 Lincoln's Inn

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(54) Onion-topping machines and parts thereof

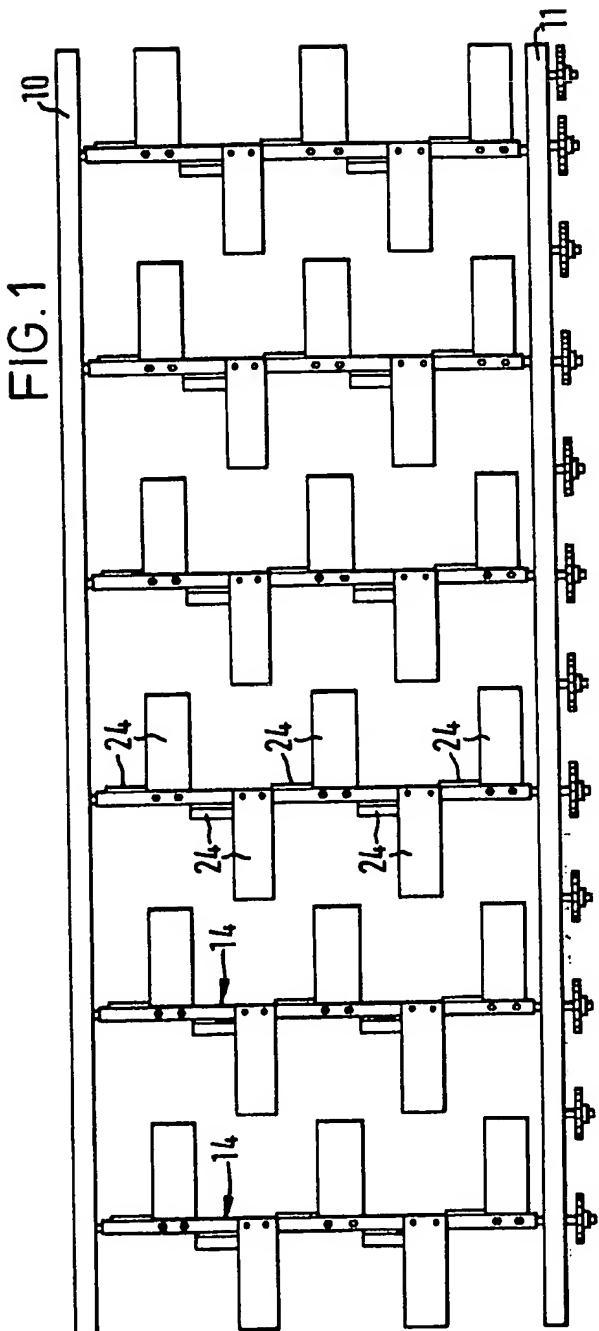
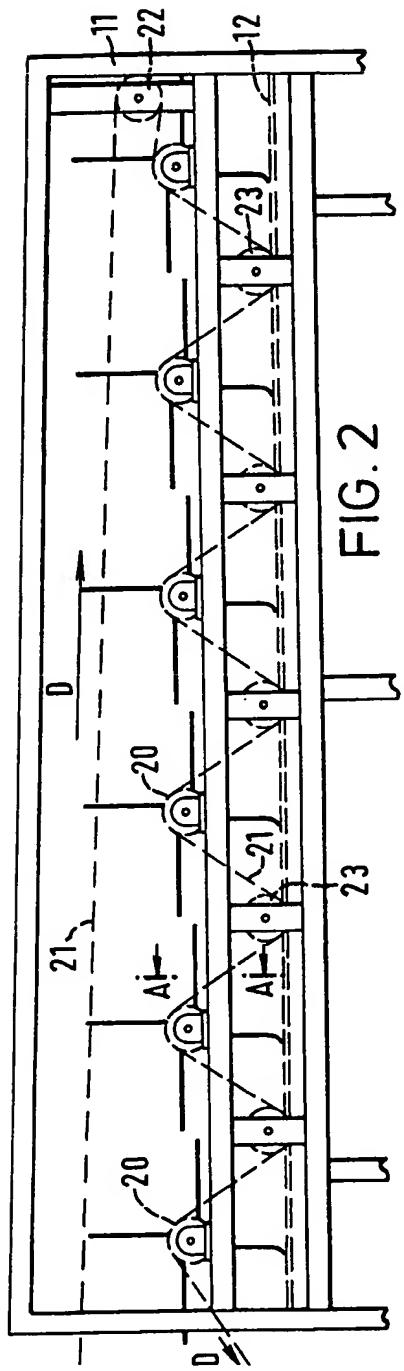
(57) An onion-topping machine has a stationary grill 12 over which onions can be moved and through which their tops can project downwards, means 25 for causing a down-draft through the grill, means 25 for cutting off onion tops projecting below the grill and means for moving onions over the grill, which last-said means comprises a series of rotatable shafts above the grill, drive means 20 for rotating the shafts, and a plurality of flat flail members 24 of flexible material carried by the shafts and extending in the lengthwise direction thereof and projecting laterally therefrom for a distance such that when each flail member is in its lowermost position it can engage onions and propel them along the grill. Preferably the flail members are made from reinforced rubber or like elastomeric material and each flail member projects for a distance such that as it approaches its lowermost position it engages the grill and is thus bent rearwardly and after it leaves its lowermost position its resilience causes forward movement of the flail member in resuming its shape.



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FIG. 3

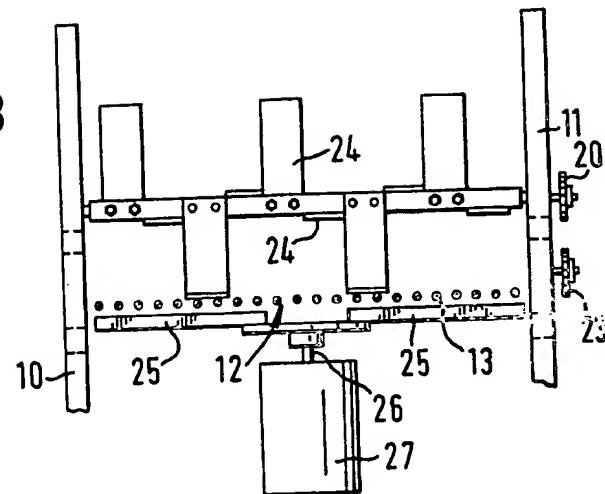


FIG. 4

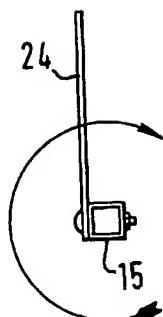
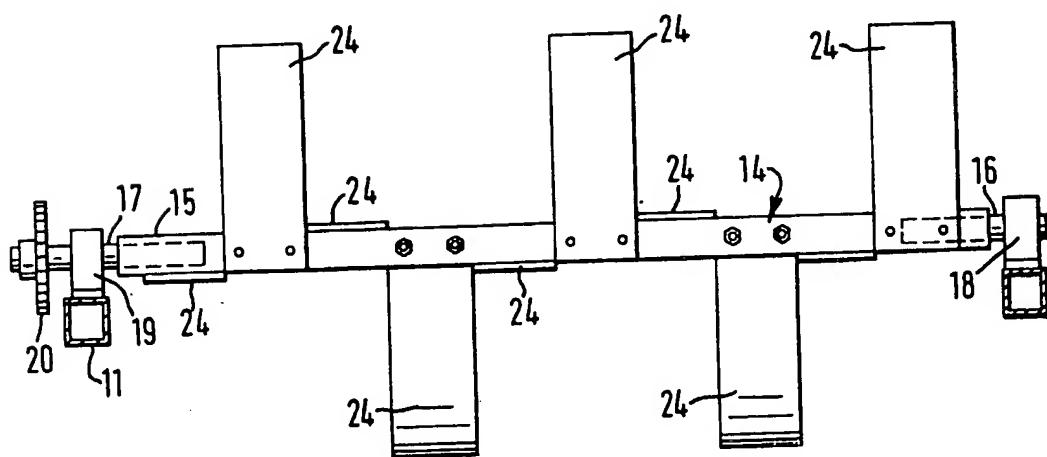


FIG. 5



## SPECIFICATION

### Onion-topping machines and parts thereof

- 5 This invention is concerned with onion-topping machines and parts thereof.
- Onions are topped (i.e. their tops are cut off) before grading and packing, either directly after lifting or after removal from store. Onion-topping machines are known of a kind having a grill over which onions are caused to pass by vibratory movement of the grill. Cutter-fans are provided below the grill and have rotating blades which cause a down-draft through the grill so as to cause onion tops to pass down through the grill, below which they are cut off by the same blades. Such machines have various drawbacks. The vibratory movement of the grill may not cause sufficient turning of the onions to ensure that their heads pass through the grill, while on the other hand the vibration tends to damage the onions. Also, the vibration gives rise to a great amount of noise.
- 25 It is an object of the present invention to provide means which can overcome or at least reduce these drawbacks.
- According to the invention, an onion-topping machine has a stationary grill over which onions can be moved and through which their tops can project downwards, means for causing a down-draft through the grill, means for cutting off onion tops projecting below the grill and means for moving onions over the grill, which last-said means comprises a series of rotatable shafts above the grill, drive means for rotating the shafts, and a plurality of flat flail members of flexible material carried by the shafts and extending in the lengthwise direction thereof and projecting laterally therefrom for a distance such that when each flail member is in its lowermost position it can engage onions and propel them along the grill.
- 45 Desirably, when each flail member is in its lowermost position, it engages or is adjacent to the grill.
- Preferably, the shafts are parallel and horizontal. Preferably, the material of the flail members is resilient as well as flexible.
- 50 Preferably, each flail member projects for a distance such that as it approaches its lowermost position it engages the grill and is thus bent rearwardly and after it leaves its lowermost position its resilience causes forward movement of the flail member in resuming its shape. This forward movement caused by the resilience of the flail member is of course additional to the rotating movement of the member and may be an important factor in causing the desired movement of onions on the grill.
- 55 Preferably, the combined non-overlapping widths of a plurality of flail members on each shaft is substantially equal to the width of the

grill. In that case, preferably the flail members on each shaft are arranged in a sequence along the shaft and consecutively displaced round the shaft in the same direction by the same angle (e.g. 90°). For example, with an angle of 90°, if a first member is regarded as projecting at 0°, a second member may project at 90°, a third member at 180°, a fourth member at 270°, a fifth member at 0° and so on.

The drive means is preferably such that at least the majority of the shafts rotate at the same speed. However, it is desirable for the shaft near the outlet end of the grid to rotate at a slower speed so that its flail members tend to slow down the movement of onions, thereby affording an improved opportunity for any remaining tops to pass through the grill and controlling the passage of onions from the grill. The flail members may suitably be made from reinforced rubber or other elastomeric material.

80 The grill preferably comprises parallel round bars extending in a direction at right angles to the shafts. Preferably the means for causing a down-draft and the cutting means comprise cutter-fans below the grill.

85 The invention further provides means for moving onions over a grill of an onion-topping machine, which means comprises shafts, drive means and flail members as aforesaid.

90 The following is a description, by way of example only, of one embodiment of the invention, reference being made to the accompanying drawings, in which

Figure 1 is a plan view of an onion-topping machine,

Figure 2 is a side elevation,

Figure 3 is an end elevation,

105 Figure 4 is an end view on an enlarged scale of a shaft and flail member, and

Figure 5 is a sectional view on an enlarged scale on line A-A in Fig. 2.

The machine has two side frames 10, 11 between which is mounted a flat grill 12 (omitted from Fig. 1 but shown in Fig. 3) formed of parallel bars 13 of circular cross-section extending longitudinally between the side frames. Six shafts 14 extend laterally

115 between the side frames above the grill. Each shaft is formed by a tube 15 of square cross-section into the ends of which are welded rods 16, 17 journaled in bearings 18, 19 carried by the side frames. Each rod 17 has a

120 sprocket 20 keyed to it beyond its bearing 19. The sprockets 20 are driven from a suitable drive by an endless driving chain 21 (shown as a broken line in Fig. 2) which moves in the direction indicated by arrows D.

125 From the drive the chain passes round an idler sprocket 22 on the side frame 11 near the outlet end of the machine and then round the sprockets 20. Between each sprocket 20 and the next, the chain passes round an idler sprocket 23 on the side frame 11, so that all

of the sprockets 20 are rotated in the same direction (anti-clockwise as viewed in Fig. 2). Each tube 15 has secured thereto by screws and nuts a plurality (ten are shown in the drawings) of flat rectangular flail members 24 which are all of the same dimensions. Each flail member is secured along one of its shorter sides to its tube as aforesaid. The flail members are made of reinforced rubber sheet.

5 In the position shown in Fig. 1, the flail members 24 on each tube are arranged as follows. The member 24 nearest to the side frame 10 is secured to the right-hand side (as viewed in Fig. 1) of the tube and extends upwards. The next member 24 is secured to the underside of the tube and extends to the right. The next member 24 is secured to the left-hand side of the tube and extends downwards. The next member 24 is secured to the 10 top of the tube and extends to the left. This sequence of positions is repeated 1½ times for the next six flail members on the tube. While this arrangement is preferred, other arrangements may be used. The adjacent longer sides 15 of adjacent flail members are at the same positions lengthwise of the tube (i.e. there is no overlap or lateral space between adjacent flail members) and the sum of the widths of the flail members on each tube is slightly less than the distance between the side frames so that substantially the whole of the width of the grill can be swept by the flail members. The length of each flail member between its tube and its free end is greater than the 20 distance between the tube and the grill. Thus, when the flail member approaches its lowermost position, its free end will brush against the grill and the lower part of the flail member will bend back, as can be seen in Fig. 1. After 25 leaving the lowermost position, the resilience of the reinforced rubber and the rotation of the flail member will cause the lower part of the flail member to move quickly forward (i.e. "flick" forward) in the direction of the outlet 30 end of the machine.

Beneath the grill are mounted a series (e.g. 35) fan-cutters each having blades 25 rotated by a vertical drive shaft 26 from an electric motor 27. The blades 25 are formed so as to 40 act as fan blades and draw air down through the grill and also so as to act as cutter blades for cutting off onion tops.

Side panels on the side frames shield the 45 fan-cutters and prevent onions from leaving the sides of the grill.

In use, onions are fed by suitable means, e.g. a conveyor, on to the grill at the inlet end of the machine (the left end in Figs. 1 and 2). The shafts are rotated by the drive chain and 50 the flail members move the onions along the grill to the outlet end, from which they are taken away by suitable means for packing. The action of the flails causes the onions to move and roll in such a way that their tops 55 fall below the grill or are drawn below the grill

by the air current and held there by the air current. The blades 25 cut off the onion tops below the grill.

As previously indicated, the machine can be 70 constructed to be a great deal quieter than machines using vibratory grills and to move onions over the grill in such a way as to optimise passage of onion tops through the grill and minimise damage to the onions.

75 Preferably, the last shaft of the series (the shaft at the outlet end) is rotated at a slower speed than the other shafts, which all rotate at the same speed. Thereby, the movement of the onions is slowed down at the outlet end of 80 the grill to assist in cutting off any remaining tops and facilitate removal of onions. This slower rotation is obtainable by providing on the last shaft a sprocket 20 which has a larger diameter than that of the other sprockets 20.

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#### CLAIMS

1. An onion-topping machine having a stationary grill over which onions can be moved and through which their tops can project

90 downwards, means for causing a down-draft through the grill, means for cutting off onion tops projecting below the grill and means for moving onions over the grill, which last-said means comprises a series of rotatable shafts

95 above the grill, drive means for rotating the shafts, and a plurality of flat flail members of flexible material carried by the shafts and extending in the lengthwise direction thereof and projecting laterally therefrom for a dis-

100 tance such that when each flail member is in its lowermost position it can engage onions and propel them along the grill.

2. An onion-topping machine according to claim 1 wherein, when each flail member is in 105 its lowermost position, it engages or is adjacent to the grill.

3. An onion-topping machine according to claim 1 or 2 wherein the shafts are parallel and horizontal.

110 4. An onion-topping machine according to any preceding claim wherein the material of the flail members is resilient as well as flexible.

5. An onion-topping machine according to 115 claim 4 wherein the flail members are made from reinforced rubber or other elastomeric material.

6. An onion-topping machine according to claim 4 or 5 wherein each flail member projects for a distance such that as it approaches its lowermost position it engages the grill and is thus bent rearwardly and after it leaves its lowermost position its resilience causes forward movement of the flail member in resuming its shape.

7. An onion-topping machine according to any preceding claim wherein the combined non-overlapping widths of a plurality of flail members on each shaft is substantially equal 130 to the width of the grill.

8. An onion-topping machine according to claim 7 wherein the flail members on each shaft are arranged in a sequence along the shaft and consecutively displaced round the  
5 shaft in the same direction by the same angle.
9. An onion-topping machine according to any preceding claim wherein the drive means is such that at least the majority of the shafts rotate at the same speed.
- 10 10. An onion-topping machine according to claim 9 wherein the shaft near the outlet end of the grid rotates at a speed lower than the other shafts.
11. An onion-topping machine according  
15 to any preceding claim wherein the grill comprises parallel round bars extending in a direction at right angles to the shafts.
12. An onion-topping machine according to any preceding claim wherein the means for  
20 causing a downdraft and the cutting means comprise cutter-fans below the grill.
13. Means for moving onions over a grill of an onion-topping machine, which means comprises a series of rotatable shafts arranged  
25 to be mounted above the grill, drive means for rotating the shafts, and a plurality of flat flail members of flexible material carried by the shafts and extending in the lengthwise direction thereof and projecting laterally there-
- 30 from for a distance such that when each flail member is in its lowermost position it can engage onions and propel them along the grill.
14. An onion-topping machine substantially as hereinbefore described with reference to the accompanying drawings.
15. Means substantially as hereinbefore described with reference to the accompanying drawings for moving onions over a grill of an  
40 onion-topping machine.

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